



*by John Tomaszewicz, President, JT Sound Inc.*

With so much discussion and emphasis on guitar amp components, I thought I would add some perspective having been a professional Components Engineer for much of my Engineering career. I have often thought that universities should have a course on Components Engineering to focus on component specification and selection. An important part of my job function was to find out what components would fail in the field or in production, and then find a solution. Quite often, I found that even the most gifted engineers would fall prey to relying on a component to perform to an unspecified parameter. The most common problem was not a bad component but things such as the component manufacturer improving their process and consequently enhancing their yield. This resulted in the device no longer functioning in the product the way the designer intended.

**INTERCONNECT RELIABILITY PROBLEMS:** Mechanical switches are often the weakest link due to contact wear and increasing contact resistance. Gold contacts must be mated with gold contacts or they provide an inferior junction to a less costly tin plated to tin plated junction. Simply stated, similar metals provide a better junction than dissimilar metals. Common use of jacks as a switching mechanism in effects loops has shown to be problematic. Primarily because of oxidation on the contact coupled with a reduction of contact force due to metal fatigue.

**CAPACITORS:** Ever see a capacitor specification for frequency response? Probably not. Most engineers know that electrolytic capacitors exhibit objectionable distortion and frequency roll-off. Even capacitors that are often thought of as good quality can have serious deviation from an ideal capacitor frequency response within the audio band. Is this roll-off acceptable and desired? This would be an example of relying on an unspecified parameter.

**ECONOMIC SHIFTS:** Common guitar amp tubes almost became extinct during the late 80's. Amplifier manufacturers had to shift to less favorable tubes to maintain production. We need to keep an eye on supply through these extremely tough economic times. A good contingency plan would be wise. Don't get caught producing a product that relies on some unspecified magic. e.g. What if your unique transformer manufacturer goes away? Shocking as this may seem, I have been through this type of issue many times and often the only solution is a costly and painful lifetime buy. As simple as these issues may seem, the exorbitant cost of ignoring

them can be overwhelming.